Forensic Science Final Exam Review
(You may use your notes, sources from the wiki page, or RELIABLE sources on the Internet)

Unit 1: Introduction to Forensics, Crime Scene Analysis & Physical Evidence

1. What are the three most basic types of crime scene recording methods? Name and describe them. Photos, sketches, notes
2. What are the parts that need to be included on all crime scene sketches? North, date, location, approximate position of evidence, all landmarks, measurements, name of person sketching, key
3. What is a chain of custody document and why is it important in an investigation? Document that identifies who has handled the evidence and this is important to ensure that evidence is not contaminated and to account for who has had contact with the evidence.
4. Explain the difference between evidence that has class characteristics and evidence that has individual characteristics. Class characteristics pinpoint a specific group and individual characteristics pinpoint a specific person
5. What is Locard’s Exchange Principle and how is this principle important to forensic science? Locard’s Exchange Principle states that every time that you come in contact with something; it results in an exchange in material. This is important for trace evidence and link suspects and victims to a specific crime scene.
6. What are the four main reasons for the increase of crime labs in the United States? Increase in crime, all drugs that are seized have to be sent to the crime lab, DNA profiling, and decrease in confessions by criminals
7. Which agency maintains the largest crime laboratory in the world? Federal Bureau of Investigations
8. Who established the first crime lab? Dr. Edmond Locard
9. What is the oldest crime lab in the U.S.? Los Angeles Police Department
10. What are the different units of a crime lab? Give an example of evidence that would be sent to each unit. Biology- blood, bodily fluids; Physical science- explosives, glass, chemicals; firearms- ballistics, handguns; document examination- forgery, fraud; photography- photos
11. Which unit has the responsibility for the examination of body fluids and organs for the presence of drugs and poisons? Toxicology
12. Forensic odontology refers to the study of teeth/bite marks.
13. What is the Frye vs. United States case and how did it influence admissible evidence? It deals with scientific evidence being admitted into court.
14. Who is Alphonse Bertillon? Developed a system of measurements for identification in the 1890s
15. What is the difference between manner of death, cause of death, and mechanism of death? Cause is the immediate reason for a person’s death, manner is the mean by which someone dies and mechanism is the specific body failure that leads to death
16. What is PMI? Post Mortem Interval
17. What is forensic anthropology? What do forensic anthropologists usually study? Forensic anthropology is the study of bones; they usually identify bodies and determine age, gender, race, etc. based on the bones
18. What is the difference between algor mortis, rigor mortis, and livor mortis? Algor mortis is the cooling of the body after death; rigor mortis is the stiffening of the body after death (present 2-30 hours); livor mortis is the pooling of blood in the body after death (present 30 minutes – 12 hours)
19. What part of the body would a forensic anthropologist most likely use to determine height? Length of femur and humerus
20. What part of the body would a forensic anthropologist most likely use to determine sex? Skull, hips
21. What part of the body would a forensic anthropologist most likely use to determine race? Skull
22. What are the categories of manners of death? Homicide, suicide, accident, natural cause
23. What bugs are most commonly used in forensic entomology? Flies and maggots
24. A man with a heart condition is attacked and dies from a heart attack during the assault. How would you categorize the manner of death? Explain your answer. Natural death because the heart attack was the means which caused him to die
25. What is the life cycle of the fly? Egg-1st instar, 2nd instar, 3rd instar, pupae, adult
Unit 2: Drugs & Toxicology
26. What are the drug classifications and what are some examples of each? Narcotics - heroin, morphine, codeine; Hallucinogens - marijuana, PCP, LSD; Depressants - alcohol, barbiturates; Stimulants - cocaine, caffeine, nicotine
27. What is the Controlled Substances Act? Legal usage and potential for abuse ratings
28. Who is known as the “Father of Forensic Toxicology”? Mathieu Orfila
29. What are the different color tests and what drugs do they identify? Marquis: Heroin, morphine and most opium-based drugs will turn the solution purple. Amphetamines will turn it orange-brown; Cobalt thiocyanate: Cocaine will turn the solution blue; Dillie-Koppanyi: Barbiturates will turn the solution violet-blue; Van Urk: LSD will turn the solution blue-purple; Duquenois-Levine Test: LSD will turn the solution blue-purple
30. What are the different types of chromatography and what does chromatography do? Chromatography separates and identifies the components of a mixture. There is thin layer, paper, gas, and GC/MS.
31. What can the shape of the bloodstain tell us about the crime? Weapon used, how many times hit, where hit, where moved, what angle the impact happened, etc.
32. What is a luminol test? Test for blood that has been cleaned up
33. What is the Kastle-Meyer Color Test? Uses phenthayline to test for the presence of blood
34. What does a blood stain that has impacted a site at LESS than 90 degrees look like? It is elongated
35. What shape does a blood stain that has impacted a site at a 90 angle have? Spherical
36. What is the difference between low velocity, medium velocity, and high velocity blood spatter? Low velocity will have larger spots; medium velocity medium sized spots and high velocity will have small spots
37. What would the correct packaging be for bloodstained material found at a crime scene? Why would you use this type of packaging? Paper packaged that is taped; allows evidence to not grow bacteria or be contaminated
38. Generally, bloodstain diameter increases as height increases.
39. What is the difference between the parent drop, the spine, and the satellite? The parent drop is the original drop of blood, the spine is the lines that spread out from the parent drop and the satellites are smaller spots that form when the parent drop hits the ground and splashes
40. What antigens are on each blood type? Type A – A antigens Type B – B antigens Type AB – A & B antigens Type O – neither A or B antigens
41. What chemical does the Kastle-Meyer test use to test for the presence of blood? Phenolphthalein
42. What is the standard test to determine if blood comes from an animal or human? Precipitin

Unit 4: DNA Analysis
43. What does “DNA” stand for? Deoxyribonucleic acid
44. What are the base pairing rules? How do they contribute to DNA's ability to be replicated? Adenine with Thyamine and Guanine with Cytosine; when DNA replicated it replicates based on its base pair
45. What is CODIS and how does it help forensic scientists? CODIS is where DNA is stored; this allows forensic scientists to make potential matches
46. Describe the process of PCR and explain why it is important to Forensic Science. To amplify a segment of DNA using PCR, the sample is first heated so the DNA denatures, or separates into two pieces of single-stranded DNA. Next, an enzyme called "Taq polymerase" synthesizes - builds - two new strands of DNA, using the original strands as templates. This process results in the duplication of the original DNA, with each of the new molecules containing one old and one new strand of DNA. Then each of these strands can be used to create two new copies, and so on, and so on.
47. What is the difference between mtDNA and nDNA analysis? Mitochondrial DNA is more prevalent than nuclear DNA; mitochondrial is maternally inherited while nuclear DNA is inherited maternally and paternally
48. What is the sugar component of DNA called? Deoxyribose
49. What is the backbone of the DNA structure composed of? Sugar (deoxyribose) and phosphate molecules
50. What is the technology that is used for DNA replication and has begun to replace RFLP? Polymerase chain reaction (PCR)
51. Can people have similar tandem repeats in their DNA even if they are not identical twins? Yes, the difference is the number of times the pairs are repeated.

Unit 5: Trace Evidence
52. Why is the cortex important in the hair shaft? It gives hair its shape and color; it is also made of keratin
53. What part of the hair shaft contains scales? Cuticle
54. What is the medulla? Inner layer running inside the center of the cortex
55. What is the difference between a natural and synthetic fiber? Which natural fiber is the most common? Natural fibers are found in the environment and synthetic fibers are man-made; cotton is the most common natural fiber
56. What are the most common crimes that involve the analysis of paint? Hit and run cases and burglary
57. What is the database that stores an automobile’s make, model, and year? PDQ
58. When examining soil, what is the most logical first step? Compare soil color

Unit 6: Arson & Explosives
59. What would the correct packaging be for burned material found at a crime scene? Why would you use this type of packaging? Metal jar or glass jar sealed to ensure that no evidence evaporates
60. What is the fire triangle? What are the three components? The three things needed to start and sustain a fire; fuel (hydrocarbon), oxygen and heat
61. Define flash point. The lowest temperature at which a liquid fuel produces enough vapors to form an ignitable mixture at its surface
62. What are accelerants? Spread or start a fire
63. What is the point of origin? How is it determined? Point of origin is where the fire started; V-patterns or highest concentration of burning
64. Is a search warrant needed to search a fire scene? No
65. Compare and contrast low and high explosions. Low explosions deflagrate (burn); high explosions explode due to the pressure buildup of gases
66. Compare and contrast primary and secondary explosions. Primary- sensitive to heat; secondary- insensitive to heat
67. What are the three types of heat transfer? Conduction- movement of heat through a solid object; Radiation- transfer of heat energy from a heated surface to a cooler surface by electromagnetic radiation; Convection- transfer of heat energy by movement of molecules within a liquid or a gas
68. What is the most widely used instrument for detecting the presence of explosive residues? Ion Mobility Spectrometer
69. How should explosive debris be packaged? Airtight containers, specifically metal cans

Unit 7: Firearms, Tools & Other Impressions
70. What are striations? How do they help when examining firearm evidence? Striations are marks that are made on a bullet from the gun; they can help identify the type of gun and also match a gun to a suspect
71. A bullet is recovered at a crime scene and a gun is found nearby. What is the next step for determining if this bullet was fired from that particular firearm? Compare the diameter (caliber) and striations; test fire gun in water to determine if it is a possible match
72. What is the difference between lands and grooves? Lands are the raised portion and grooves are the indented portion
73. What is ballistics? Study of bullets and their spent cartridge casings for markings left on them by the firearm that shot them
74. What are the elements that are present in gunshot residue? Lead, barium, antimony
75. What is the database where images of fired bullets can be searched? NIBIN
76. What can gunshot residue determine? Distance victim/suspect was from gun
77. What is rifling? Helical grooves that are found on the inside of a firearm barrel
78. What type of guns have rifling? Handguns and rifles
79. What type of crime scene are tool marks most common? Burglary

Unit 8: Fingerprints & Document Analysis
80. What is the difference between forgery and fraudulence? Forgery is a process used by
criminals to make, alter, or falsify a person’s signature or another aspect of a document with the intent to deceive another. Fraudulance is when material gain accompanies forgery.

81. What is an exemplar? Sample of handwriting that is taken from a suspect

82. What element is contained in counterfeiting detecting pens and markers? Iodine

83. What are the 12 characteristics of handwriting? Line quality, word/letter spacing, size consistency, continuous, connecting letters, letters complete, cursive/printed, pen pressure, slant, line habits, embellishments, diacritic placement

84. What is AFIS? How is it important to fingerprint evidence? Automated Fingerprint Identification System

85. Besides identification, why are having fingerprints important? Allows you to grip things

86. What are minutiae points and how are they important to the individuality of fingerprints? Minutiae points are characteristics that identify fingerprints; they allow for potential matches to be made

87. What is the difference between a visible, latent, and plastic fingerprint? Visible fingerprint is a 2D print that can be seen; latent prints are invisible and plastic fingerprints are 3D impressions

88. What are the three types of fingerprint patterns? Whorl, loop, arch

89. What is the most common type of fingerprint pattern? The rarest type of pattern? Loops; arches

90. What substance, used to recover latent fingerprints, gives a purple print after processing? Ninhydrin

91. Pigment granules that impart hair with color are found in the cortex of the hair shaft.

92. What are the three stages of hair? Anagen, catagen, telogen

93. In what stage can a hair most readily be removed from the scalp? Telogen

94. How many deltas are in each an arch, a loop, and a whorl? (You need three answers) Arch-0, loop-1, whorl-2

95. Which technique allows visualization of latent fingerprints using cyanoacrylate vapors? Superglue fuming